ED6-3-INV

A Thirty History of Superconducting Microwave Devices and Fundamental Studies Thereof

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Thirty years have passed since the discovery of high-temperature superconductors (HTS), and practical applications of HTS equipment and devices are moving into full-swing. From the beginning of their discovery, the use of HTS in microwave devices has been recognized as one of their most practical applications. This is because the microwave surface resistance of HTS is less than 1/1000 of that of pure copper and from early on researchers recognized that high performance of microwave passive devices could be realized by utilizing the characteristics of HTS. In addition, the size of HTS microwave devices is relatively small, and they can be cooled by a small cryocooler. Furthermore, we could establish high-quality HTS thin-film fabrication technology essential for producing high performance microwave devices in a short period of time. In view of the above, I would like to present an overview of the past thirty years of superconducting microwave devices and fundamental studies thereof covering following topics.
(1) HTS film conditions required for highly efficient microwave devices [1]
(2) Superconducting bandpass filters[2,3]
(3) Other prospective superconducting microwave devices[4]

References

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Keywords: superconducting microwave device, superconducting filter, HTS, NMR superconducting probe

IEEE/CSC & ESAS SUPERCONDUCTIVITY NEWS FORUM (global edition), February 2018.
Received January 10, 2018; Selected January 24, 2018. Reference STP616.
Plenary presentation ED6-3-INV was given at ISS 2017, December 13-15, 2017, Tokyo, Japan.